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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,346	11/20/2003	George A. Pavlath	NGC-153/000060-199	1241

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EXAMINER	
CHIEM, DINH D	
ART UNIT	**PAPER NUMBER**
2883	

DATE MAILED: 01/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

5Y

Office Action Summary	Application No.	Applicant(s)	
	10/718,346	PAVLATH, GEORGE A.	
	Examiner	**Art Unit**	
	Erin D. Chiem	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Brian Healy

Brian Healy
Primary Examiner

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to the request for continuing examination filed on December 22, 2005. Currently, claims 1-25 are pending.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vengsarkar (US 5,430,817) in view of Orthonos et al. (Artech House, Inc., 1999) and in further view of Goldberg et al. (US 6,731,837) and Michal et al. (US 6,025,915).

Vengsarkar discloses an apparatus comprising a light source (col. 4, line 54), a first long period grating (Fig. 5, 57) optically coupled with the light source; and an amplification fiber (54) that is optically coupled with the long period grating; wherein the light source send one or more pump optical signals (56) to the long period grating; wherein the long period grating transmits the one or more pump optical signals to the amplification fiber; wherein the amplification fibers absorbs a subset of the one or more pump optical signals and emits one or more output signals; where in the long period gratings attenuates the one ore more output signals. Long period gratings are well known, will be proven in the subsequent sources, to attenuate (or also known as loss, SearchNetworking.com) for it was designed to discriminate by rejecting desired

wavelengths dependent on apparatus building specifications. Instead of reflecting the rejected wavelength like Bragg gratings, long period Bragg gratings couple the rejected wavelength to the cladding. Hence, the pump signals sent through by element 56 into the long period grating 57 is pumped at a range of wavelengths and the output wavelength sent from long period grating 58 is without a range of wavelength, or can also be interpreted as "substantially same second wavelength" relative to the signal sent from long period grating 57 "substantially first wavelength." As closely disclosed by Vengsarkar 1 in how to space the gratings in such a way that the gain flattening or more well known as attenuation can be more uniform over a range of wavelengths of 1530 – 1560 (col. 3 line 65 - col. 4, line 14). Furthermore, the limitations regarding reducing or promoting decrease in backreflections and the limitations regarding the residual signals from the gratings are merely characteristics of the long period Bragg gratings. However, Vengsarkar does not disclose "long-period Bragg gratings" but only referred to as long period gratings as the optical elements for attenuating the unused pumped energy. Furthermore, Vengsarkar does not disclose employing fusion splice as the coupling means for the separate elements: light source, long period gratings, pumping elements, and the erbium doped fibers. And finally, Vengsarkar does not disclose sending the output signal into an optical gyroscope.

Orthonos et al. teach in the fundamental theories of Bragg gratings that long period gratings are a species of Bragg gratings. Orthonos cross referenced to Vengsarkar 2 as the scientist who found the characteristics of the long period gratings can be applied as low-loss band-rejection filters. The periodicity of the long period grating is chosen to couple light from the guided single mode LP_{01} of the fiber into the forward propagating cladding modes, where it is lost due to absorption, such as erbium doped amplification fibers, and scattering. The phase-

matching condition that determines the exact periodicity of the grating; for two forward-propagating modes (i.e., first wavelength and second wavelength) dictates that the period of the Bragg grating must be long or longer than the transmitting wavelength. Such forward propagating coupling is key to the sought after characteristic of low backreflection in long-period Bragg grating (Orthonos, pp. 142 – 143).

Goldberg et al. disclose an optical fiber amplifiers and lasers and optical pumping device which employ fusion splicing through out the device for the purpose of low loss coupling, well-known in the art, and for the removal of pump light in the cladding [0058].

Michal et al. teach a system for performing scale factor stabilization of a broadband optical signal used in fiber optic gyroscopes employing a broadband light source, pump laser diode, and placing the gyroscope in line with the bandpass filter which stabilize the centroid wavelength. This is critical in the apparatus since the bandpass filter only allow a narrow band of wavelength 1540 – 1570 nm wavelengths to pass, the centroid wavelength, and attenuate the rest of the wavelength. The linearization scale factor is determined by the output optical signal sent to a photodetector convert the optical signal intensity of the interference pattern produced by combining the waves that have propagated through the sensing coil to an electrical signal. The scale factor allows the measure of the rotation of the gyro and the phase information to be correlated (col. 5, line 13-42). Michal et al. teaching of scale factor stabilization of a broadband fiber source used in fiber optic gyroscopes is for the purpose of reducing the linearization scale factor error when the sensing coil in such measuring apparatus is exposed to ionization radiation which cause the centroid wavelength to shift. Furthermore, Michal et al. teach the filtering of pumped broadband input signal through the coupling of modes into the cladding of the fiber

through hi-pass filter and low-pass filter result in the narrowband output (Fig. 7B, col. 4, line 37-59).

Since Vengsarkar, Orthonos et al., Goldberg et al. and Michal et al. are all from the same field of endeavor, the purpose disclosed by Orthonos et al., Goldberg et al. and Michal et al. would have been recognized in the pertinent art of Vengsarkar.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to: 1) Understand through the disclosure of Vengsarkar that the "long period spectral shaping device" is an alternative lexicography for the conventionally known long period Bragg grating, that the inventor was credited for the research of using long period Bragg grating as a low loss band rejection filter. 2) In a measuring system which employs a broadband light source, a pump laser diode, Erbium doped amplification fibers, long period Bragg gratings, and other optical components such as photodetectors and optical gyroscope that it would have been obvious to employ fusion splicing in place of the broadly claimed six different splices indicated by Michal et al. in Fig. 5. 3) It is clearly obvious at the time the invention was made to a person having ordinary skill in the art to use the long period bandpass filter. Michal teaches using high-pass and low-pass filter which results in the narrowband output and Vengsarkar spectral shaping device is used for the purpose of low loss band pass filter, thus one having ordinary skill in the art would be able to apply the teaching of Vengsarkar's filter and implement the filter in Michal's scale factor stabilization system where band pass filter is required. Vengsarkar taught that **the motivation** for employing is that long period bandpass filter is less susceptible to ionization radiation to stabilize the centroid wavelength for providing more correct linearization scale factor such that the rotation of the gyroscope and phase information of the

optical signal may be correlated to extract parameters of interest. Such measuring instrument is most beneficial in harsh and radiation environment. **The motivation** for employing fusion splicing rather than mechanical splicing is for the economical value of fusion splicing and fusion splices require extraneous splicing components such as V-shaped metal clamps, see non-patent literature "Lennie Lightwave's Guide to Fiber Optics: Termination and Splicing" for more comparative details. Another **motivation** for using fusion splicing is the low loss coupling ability that fusion splicing provides to the system. And most importantly, fusion splicing double cladding fibers to remove residual pump/residual light in the cladding.

Response to Arguments

In response to applicant's arguments against Vengsarkar, Orthonos, and Goldberg references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The reference of Vengsarkar was applied for the teaching of the low loss bandpass filter, which teaches the attenuation of the amplified signal by coupling the rejected bands into the cladding.

The reference of Orthonos is to provide the applicant with evidence that the lexicography used in the '817 reference, "long period spectral shaping device" is the same device that applicant is claiming, "long period Bragg grating." The reference was not used to demonstrate the attenuation of the reverse light directed towards the pump light source.

The reference of Michal was applied for the teaching of scale factor stabilization of a broadband fiber source used in fiber optic gyroscopes sensing system. The reference was not used to demonstrate the attenuation of the reverse light directed towards the pump light source.

The reference of Goldberg was applied to demonstrate how one having ordinary skill in the art would fusion splice a light source, a pump source, doped core fiber having at least two claddings, and other optical elements are coupled together. The reference was not used to demonstrate the attenuation of the reverse light direct toward the pump light source.

In response to applicant's arguments that Vengsarkar does not teach removing the output energy from the amplifier towards the pump source, this argument is spurious. The Examiner respectfully reminds the applicant that the citation of columns and lines and figures are exemplary and the applicant must review the reference as a whole. Vengsarkar clearly teaches the long period devices remove the reflected light in both directions from a guided mode to a non-guided mode (col. 2, lines 60-62). Clearly, one of ordinary skill in the art would understand that the transferring of light to a non-guided mode is a process of light removal.

In response to applicant's argument that Michal's teaching of the WDM coupler eliminates a need for long period Bragg grating does not overcome the prima facie case of obviousness. Moreover, the open-ended transitional phrase "comprising" that applicant used in the claim language does not positively exclude using the WDM coupler in the system. Furthermore, Michal's WDM coupler is the element incorporated to improve Vengsarkar's device, thus there is no motivation to remove the WDM in Michal's system and revert back to Vengsarkar's original device.

Regarding applicant's argument that Michal and Goldberg only teach coupling two optical components and not incorporable to Vengsarkar's teaching of coupling three or more components is not persuasive since it only requires a routine experimentation for one of ordinary skill in the art to modify a coupler from coupling two components to coupling three or more components.

Regarding applicant's argument that Michal's teaching does not read upon the limitation "a long period Bragg grating that is optically coupled with the light source via a first optical splice" is spurious. It is understood that the phrase "optically coupled" may be broadly interpreted as the passage of light from element A, long period Bragg grating, to element B, light source. Being "optically coupled" does not necessarily mean element A and element B are directly connected, respectively. Moreover, the elements are "optically couple…via a first optical splice" is also read upon by Michal since applicant does not specified the exact location of the "first splice" such as where the first splice is respect to the optical elements in the system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin D. Chiem whose telephone number is (571) 272-3102. The examiner can normally be reached on Monday - Thursday 9AM - 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank G. Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Brian Healy
Primary Examiner